SECTION

I

AMA Overview

Preface

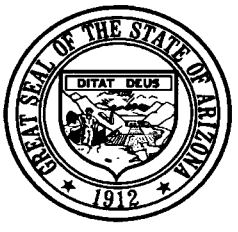
Section I of the Third Management Plan provides an overview of the Arizona Department of Water Resources' (Department) water management approach, a description of the physiographic and hydrologic conditions, and water resources of the Phoenix Active Management Area (AMA), and a detailed description of water use characteristics of the various water use sectors within the AMA. The physical water resources data presented in Chapter 2 and the historic water use and associated water use trends described in Chapter 3 provided the Department with important information from which it developed a baseline water budget. Information presented in this section was also used in developing water management programs which are presented in Section II and the future conditions and directions presented in Section III.

In Section I, the Department intends to provide the reader with a better understanding of the management approach, the water resources, and the water use characteristics of the Phoenix AMA. Such an overview is necessary to better appreciate the reasoning, perspective, and methods being taken by the Department as it continues to develop a long-term water management strategy, with particular emphasis on the third management period (2000 to 2010).

CHAPTER

1

Water Management Approach



1.1 INTRODUCTION

This chapter describes the goals, objectives, and contents of the Third Management Plan for the Phoenix Active Management Area (AMA). It also provides an overview of the Arizona Groundwater Code and water management problems experienced in AMAs. The following topics are discussed:

- Arizona Department of Water Resources' mission
- Overview of the Code and some of its key provisions
- An institutional overview of the Phoenix AMA
- The principles, objectives, and content of the Third Management Plan
- Emerging challenges for the Phoenix AMA

1.2 THE ARIZONA DEPARTMENT OF WATER RESOURCES' MISSION

The Arizona Department of Water Resources (Department) was created by the 1980 Groundwater Code (Code) to manage the water resources of Arizona. The Department administers state laws, explores methods of augmenting water supplies to meet future demands, and works to develop public policies which promote efficient use and equitable allocation of available water supplies. To secure long-term water supplies for Arizona, the Department oversees the use of surface water and groundwater in the state and represents the state's interests in interstate and federal issues. The mission of the Department is:

> *To ensure a long-term, sufficient and secure water supply for the state; to develop public policy which promotes efficient use and equitable distribution of water in an environmentally and economically sound manner; and, to promote the management of floodplains and dams to reduce loss of life and damage to property.*

1.3 THE ARIZONA GROUNDWATER CODE

In 1980, Arizona made a commitment to the long-term management of its limited groundwater supplies through the passage of the Code. The goals of the Code are to eliminate severe groundwater overdraft in areas of the state where groundwater supplies have been rapidly diminishing and to provide the means for allocating Arizona's limited groundwater resources to most effectively meet the state's changing water needs.

The Code limits withdrawals of groundwater within AMAs to holders of grandfathered rights, service area rights, groundwater withdrawal permits, and small domestic users. Under the Code, groundwater uses existing at some time between 1975 and 1980 were allowed to continue within the limits established under a new water rights system, and new uses were required to be consistent with AMA management plans and goals. Readers who are not familiar with the different types of groundwater rights established by the Code are encouraged to read the Glossary of Terms attached as a supplement to the management plan. The Code also contains provisions to minimize and to replace groundwater use through conservation and use of renewable sources. The full text of the Code can be found on the following Web site: www.azleg.state.az.us

1.3.1 The Groundwater Problem

The Code was enacted in response to serious water level declines in the aquifers in central and southern parts of the state. Groundwater overdraft in certain areas of Arizona has resulted in the lowering of groundwater levels by as much as 600 feet. Groundwater depletion has made it economically infeasible to pump water in some cases, has caused the lowering and cracking of the land surface (subsidence and earth fissuring), has caused aquifer compaction resulting in the loss of aquifer storage space, and has resulted in

water quality problems due to the migration of poor quality water and general deterioration of aquifer water quality with depth. Continued overdraft of groundwater supplies will exacerbate these problems.

1.3.2 Provisions of the Groundwater Code

The regulatory provisions of the Code are focused primarily on areas of the state that have been designated as AMAs. These areas are located where competition for groundwater supplies is most severe, primarily in the central and southern parts of the state.

Statewide, there are provisions addressing well drilling, well registration, and construction requirements; water adequacy requirements for new subdivisions; and limitations on transportation of groundwater across watershed boundaries.

Within AMAs, the Code established a new groundwater rights system which strictly limits groundwater withdrawals; prohibits the development of new irrigated farmland; requires new subdivisions to have long-term, dependable supplies; and requires measuring and reporting of groundwater withdrawals. Management goals are established for each AMA, and a series of five management plans containing mandatory conservation requirements for industrial, municipal, and agricultural water users must be developed. Other programs within AMAs include conservation assistance, augmentation, and monitoring of the water supplies.

The Code also established Irrigation Non-Expansion Areas (INAs). Within these areas there can be no new irrigated land, and owners of large wells are required to meter their water use and file annual reports with the Department. Otherwise, groundwater management in INAs is not highly structured.

1.3.2.1 Creation of the Active Management Areas and Irrigation Non-Expansion Areas

Upon enactment of the Code, four AMAs were established where overdraft was most severe: Phoenix, Tucson, Pinal, and Prescott. In 1994, the Santa Cruz AMA was created from the southern portion of the Tucson AMA. The Code also established two INAs: Douglas and Joseph City. A third INA, Harquahala, was designated by the director in June 1982. Figure 1-1 shows the location of the five AMAs and the three INAs. Groundwater management programs in AMAs are focused on the protection of groundwater supplies for current and future users. Programs in INAs are limited to a restriction on new agricultural lands and water measuring and reporting requirements. The Joseph City and Harquahala INAs are managed from the Phoenix AMA office.

1.3.2.2 The Management Goals

For three of the AMAs, Prescott, Tucson, and Phoenix, the management goal to be reached by the year 2025 or earlier is safe-yield. The attainment of this goal is expected to occur incrementally over the five management periods. However, it is clear that from a supply-availability perspective the goal will be easier to attain in the early years while Colorado River supplies are in surplus. Maintaining the safe-yield goal beyond 2025 may become more difficult over time as demand increases for municipal and industrial growth and renewable supply surpluses decrease.

To address the unique hydrologic nature of the Santa Cruz AMA, the goal identified for that AMA is to maintain safe-yield and prevent local water tables from experiencing long-term declines. In the Pinal AMA, where a predominately agricultural economy exists, the goal is to protect the agricultural economy as long as feasible and preserve water supplies for future non-agricultural purposes.

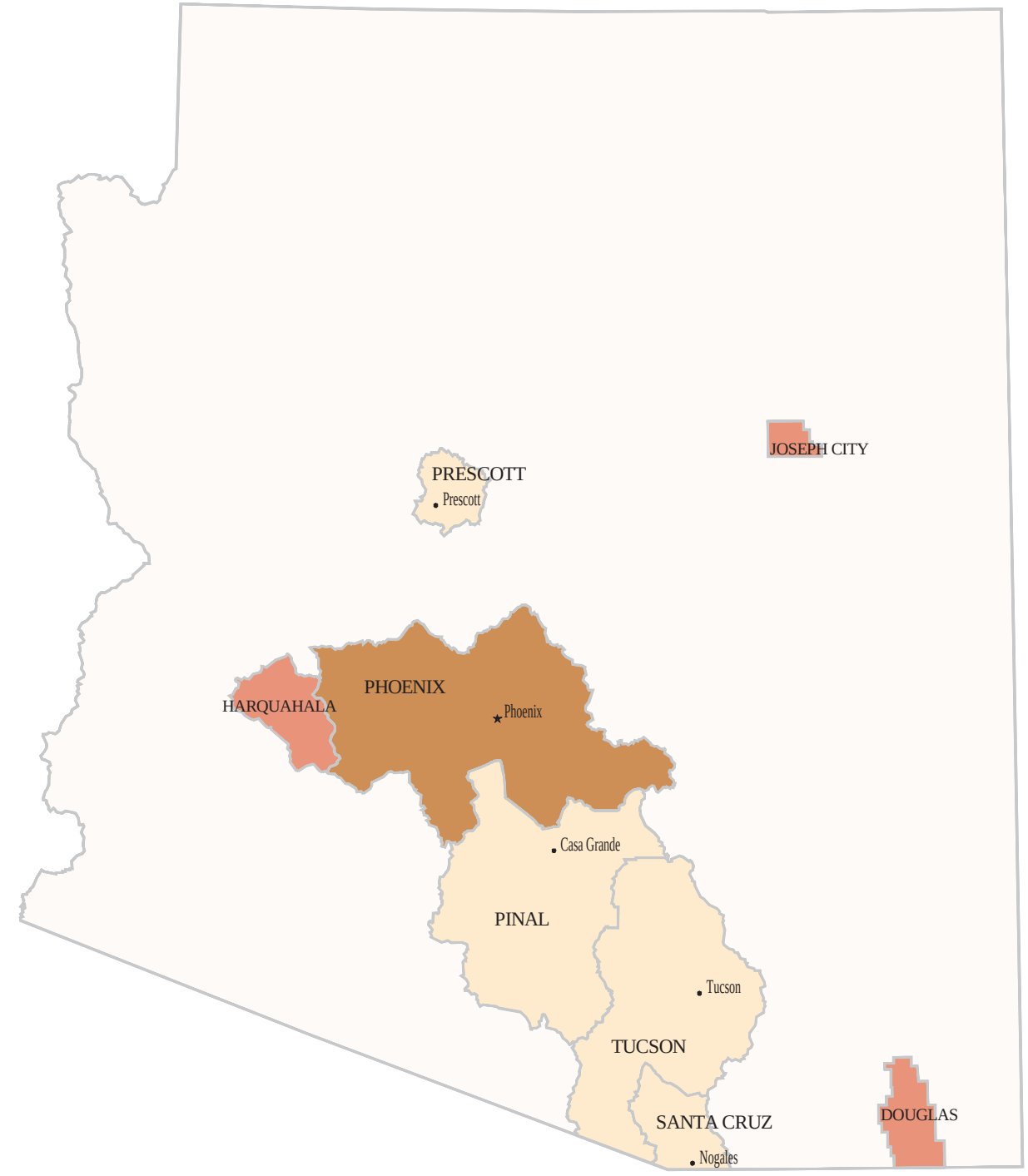


Figure 1- 1

Active Management Areas
and Irrigation Non-Expansion Areas

ORIGINAL SOURCE
Arizona Department of Water Resources
Geographic Information System

Achieving safe-yield, as defined in the Code, means "to achieve and thereafter maintain a long-term balance between the annual amount of groundwater withdrawn in an active management area and the annual amount of natural and artificial groundwater recharge in the active management area." A.R.S. § 45-561(12). The volume of groundwater that can be withdrawn while maintaining a safe-yield condition in the AMA will not be a fixed amount; it will change due to annual variations in incidental recharge, natural recharge, and safe-yield recharge. If long-term water level trends (after adjusting for stored credits) show declining water tables on an AMA-wide average basis, groundwater withdrawals will have to be reduced and the safe-yield volume estimate adjusted accordingly. If long-term water levels rise (after adjusting for stored credits) above the level expected due to variations in incidental recharge, natural recharge, and safe-yield recharge, groundwater withdrawals may be increased. These evaluations of the impacts of withdrawals on long-term water levels could be made at regular intervals to ensure long-term groundwater level stability.

Information from annual water use reports is used to estimate the volume of groundwater withdrawals, water stored, and recovered water in an AMA. Water budgets are constructed to illustrate the total supply and demand picture. At the point in time where water budget estimates indicate groundwater withdrawals have been reduced to a safe-yield volume, groundwater levels will need to be monitored in the context of a hydrologic model to ensure that a safe-yield condition is maintained and to understand the effects of stored water. Hydrologic models can be used to predict changes in water levels based on projected groundwater pumping and credit recovery patterns and to verify assumptions in the water budget. The Department's subsidence monitoring and gravity surveys will be increasingly useful in verifying whether water level rises result from increases in storage or from changes in aquifer compaction over time.

Safe-yield is achieved on an AMA-wide basis; the Code does not recognize localized achievement of safe-yield. The amount of groundwater pumped under safe-yield conditions is not allocated on a subbasin or local basis. It is recognized that as safe-yield conditions are attained on an AMA-wide basis some areas could be depleted, some areas of active recharge could be in surplus, and other areas could achieve a localized balance between the amount of water recharged and pumped.

Since the development of the Second Management Plan, new information has become available regarding the physical availability and distribution of water supplies. For example, recent publications by the United States Geological Survey have heightened awareness of the potential for land subsidence in the AMAs. This improved understanding of the risks associated with ongoing pumpage in certain areas brings a new perspective to safe-yield. It is clear that a more site-specific, local resource management approach is needed. Additional tools may be required to develop a more resource-based, localized water management program.

During the third management period, a critical area management strategy will be evaluated that establishes additional water management goals for specific geographic areas within the AMA. These goals may relate to mitigation of subsidence, water supply reliability, water quality management, implementation of Indian water rights settlements, or other groundwater supply-related considerations.

1.3.2.3 Management Plans

To achieve the management goal for each AMA, water management requirements are established in each of the five management periods. The five management periods are:

First Management Period:	1980-1990
Second Management Period:	1990-2000
Third Management Period:	2000-2010
Fourth Management Period:	2010-2020
Fifth Management Period:	2020-2025

Requirements for each management period are described in separate management plans prepared for each AMA. Management plans include water conservation requirements for agricultural, municipal, and industrial groundwater users; a water quality assessment and management program; an augmentation and recharge program; conservation and augmentation assistance programs; and other management programs which define how the AMA will achieve its management goal. In each successive period, the preparation of a management plan provides the Department and AMA water users with the opportunity to analyze the effectiveness of water management efforts and address unresolved water issues in the AMA. Adjustments in water management strategies and conservation requirements are made in each successive plan to help achieve the management goals.

The First Management Plan (adopted at the end of 1984) was the first step toward a comprehensive and effective management program. The plan initiated conservation programs and focused attention on important water management issues. The Second Management Plan expanded on the conservation programs of the First Management Plan and initiated the integration of water augmentation into the AMA management strategy. The Second Management Plan placed a strong focus on the implementation of water conservation measures to achieve cost-effective levels of efficient water use. New programs for conservation and augmentation assistance were included as well.

Even after the implementation of two management plans, groundwater remains a significant source of supply for municipal, agricultural, and industrial uses. The total groundwater overdraft in the Phoenix AMA decreased from 597,000 acre-feet in 1985 to 360,019 acre-feet in 1995, but remains a significant problem.

The third management period constitutes the midpoint in Arizona's effort to achieve its groundwater management goals. After the end of the third management period in 2010, there will only be 15 years left to achieve safe-yield by 2025. The Third Management Plan must identify a water management strategy that encompasses the use of water conservation, augmentation, recharge, and water quality management by the agricultural, municipal, and industrial sectors to achieve the safe-yield goal. Further, the plan must prescribe those actions and programs necessary to achieve the water management strategy during the third management period. All water users must continue to commit to using available water supplies efficiently and to making additional use of renewable supplies to replace existing groundwater use and to meet growing water demands.

Water conservation requirements in the Second Management Plan provide the basic structure of the requirements to be applied during the third management period. Incentives for renewable resource utilization remain. Perhaps the most significant component of the Third Management Plan is the identification of the water management issues requiring resolution during the third management period that are preconditions to safe-yield attainment. In addition, the Third Management Plan introduces the proposal to address water management issues from a local area perspective. The Third Management Plan describes the developing role the Department and the water-using community must play in meeting water management objectives. It also addresses the resources and commitment needed from both the Department and water users to achieve the safe-yield goal.

1.3.2.4 Assured Water Supply Program

The Assured Water Supply Program (AWS Program) plays a key role in achievement of the management goal, since it requires what will soon be the largest water use sector to move from dependence on mined groundwater to the use of renewable supplies. The Code prohibits the sale or lease of subdivided land in an AMA without the demonstration of an assured water supply. The AWS Program was instituted in 1980, but substantially strengthened in 1995 with the adoption of the Assured Water Supply Rules (AWS Rules). Under these AWS Rules, new development within an AMA must demonstrate that sufficient water supplies of adequate quantity and quality are available to meet the proposed new development uses for 100

years. Only after demonstration of a sufficient water supply can a development be approved for sale to the public. AWS Rules apply to developers who seek a Certificate of Assured Water Supply (Certificate of AWS) for an individual subdivision and to water providers (cities, towns, and private water companies) seeking a Designation of Assured Water Supply (Designation of AWS). A Designation of AWS results from a demonstration that there are adequate water supplies available to the water provider to meet current and future demands on their entire system for 100 years. While exclusive use of groundwater was allowed historically (pre-1995) to demonstrate an assured water supply, the new AWS Rules require that water supplies used to demonstrate an assured water supply must be renewable water sources such as surface water, effluent, imported groundwater, credits from extinguishment of groundwater rights, and water stored pursuant to an underground storage project. However, some groundwater is allowed in the demonstration through the groundwater phase-in allowance.

1.3.2.5 Revisions to the Groundwater Code

Since 1980, the Code has undergone numerous changes to address emerging water management issues. Sections have been added to limit use of water in artificial lakes, address underground storage and recovery of water, limit transfer of groundwater between groundwater basins statewide, establish groundwater replenishment districts, establish the water conservation assistance program, and to provide alternative municipal and agricultural conservation programs. In addition, numerous changes have been made to expand or clarify previous language and to deregulate small groundwater users.

Throughout this process, the fundamental concepts of allocating the right to use groundwater and planning for the efficient and economic use of the water have been preserved. The Code, as comprehensive as it is, does not contain detailed instructions on how to manage water resources. Instead, it provides a framework from which water management decisions are made in the AMAs. It is up to the Department and water users, through the development and implementation of the management plans, to establish the management strategies that lead to achieving safe-yield and related management goals.

1.4 GOVERNMENTAL AND INSTITUTIONAL SETTING

Water management activities within the Phoenix AMA are carried out by a number of entities. City, county, and regional governmental functions include flood control, water supply and wastewater management, water quality management, and planning and zoning. Several user groups, advisory committees, citizens' groups, and other organizations play significant roles in developing legislative and policy guidelines and educational programs relating to water use and conservation. The Groundwater Users Advisory Council (GUAC) advises the director of the AMA and the director of the Department on issues relating to groundwater management in the AMA.

The Arizona Municipal Water Users Association (AMWUA) is a planning and lobbying group that addresses water resource issues of the larger municipalities in the Phoenix metropolitan area.

The West Valley Central Arizona Project Subcontractors (WestCAPs) is a group of community leaders that evaluate water resource issues and plan for the needs of the western Phoenix metropolitan area.

The Northwest Valley Water Resource Advisory Board, created in 1996, provides a forum to examine water issues facing the Sun Cities.

The Agri-Business Council (ABC) is a lobbying group representing agricultural interests in the state.

The Central Arizona Water Conservation District (CAWCD), also known as the Central Arizona Project (CAP), is a multi-county governmental agency that was formed to reimburse federal CAP canal construction costs, operate the CAP canal, and deliver CAP water to users in AMAs. The CAWCD is

overseen by an elected board of 15 members, which represents the three-county service area of the district. The Central Arizona Groundwater Replenishment District (CAGRD) is a tax-exempt public improvement district authorized by state legislation to acquire water supplies to replenish aquifers depleted by district members. It is an organizational unit of the CAWCD and is overseen by the CAWCD board.

The Arizona Water Banking Authority (AWBA) was created in 1996, primarily to ensure that Arizona's municipal and industrial allocations of Colorado River water will be protected in times of shortage. The AWBA uses several funding sources to buy excess CAP water and recharge it for the future benefit of users both inside and outside of the CAP service area. The AWBA is authorized to store water to support the management objectives of the AMAs and to engage in interstate water banking under specific conditions. The AWBA has a five-member appointed board chaired by the director of the Department. The AWBA staff are housed in the Department's offices.

The Arizona Water Protection Fund (AWPF) was established in 1994 to provide grant monies for implementation of projects to protect or restore the state's riparian areas. The AWPF may be used to purchase CAP water or effluent for riparian enhancement. The AWPF Commission oversees the grants process; the director of the Department serves as an ex-officio member on the Commission and the staff are located within the Department.

At the state level, the Arizona Department of Environmental Quality (ADEQ) develops and enforces water quality regulations. Through recent legislation (amending provisions of the Water Quality Assurance Revolving Fund, or WQARF), the Department and ADEQ jointly participate in specified activities related to protection of groundwater quality and remediation.

The Arizona Corporation Commission (ACC) regulates the activities of private water companies, particularly those related to rate-setting.

The Arizona Department of Real Estate works with the Department to assure availability of water for new subdivisions under the AWS Rules.

Federal water management activities in the Phoenix area include the Bureau of Reclamation's involvement in regional water supply planning and participation in negotiations to provide water resources to Indian communities on behalf of the Secretary of the Interior. Additional federal water management activities include Army Corps of Engineers' studies, the Environmental Protection Agency's Superfund program, and the National Pollutant Discharge Elimination System permit program. The United States Geological Survey works independently and in conjunction with the Department in the collection and analysis of hydrologic and subsidence-related data and flood warning information.

The Gila River Indian Community, Salt River Pima-Maricopa Indian Community, and Fort McDowell Indian Community are also actively involved with issues related to the use of groundwater and renewable water supplies. These communities are governed by their respective tribal councils and, similar to municipalities or counties, have responsibility for water and wastewater management, planning, and zoning.

1.5 DEVELOPMENT OF THE THIRD MANAGEMENT PLAN

Preparation of the Third Management Plan has been guided by a set of overriding principles and specific objectives. These principles and objectives and the specific contents of the plan chapters are described below.

1.5.1 Guiding Principles for Program Development

The Code provides the Department with many management tools that vary in their flexibility and approach. In addition to the Code, general management principles have been developed to guide the operations of the Department and the preparation of the Third Management Plan. These are:

- **The authorities granted to the Department must be integrated into a comprehensive strategy for meeting the management goals of the AMA.** Numerous tools are provided by the statutory structure to assist in meeting water management objectives. These tools include: (1) water rights components of the Code, (2) assured water supply provisions, (3) underground storage and recovery provisions, (4) permitting requirements and conditions, (5) authority to develop well-spacing rules, (6) AWBA and AWPF programs, (7) conservation and augmentation assistance programs, and (8) water use reporting and enforcement authorities. All of these activities must be integrated and focused toward meeting the goal.

- **Effective water management must include both supply augmentation and demand management programs.** Supply augmentation includes substitution of renewable supplies for non-renewable groundwater resources, storage of excess renewable water for future use, utilization of effluent, and meeting new demands with renewable supplies. The major focuses of demand management are water conservation and restrictions on certain users such as lakes, which extend the availability of existing water supplies to serve more uses over a longer time frame.

- **Effective and efficient water management must establish a long-term perspective and be regional in scope.** The Department is responsible for ensuring sustainable supplies for future generations. If possible, safe-yield should be achieved sooner than 2025, and efforts to ensure that the goal can be maintained after 2025 should be required.

- **Water users must have an integral role in management program development and implementation.** Water users with expertise in their own water use sector must play a major role in development and implementation of water management programs to ensure the success of these programs.

- **All water sources need to be included in any long-term, comprehensive water management strategy.** As groundwater use reductions are dependent on the efficient utilization of groundwater and non-groundwater sources of water, the eventual inclusion of all sources of water in the development of water management programs is essential.

- **Water management efforts must consider economic impacts and feasibility.** Attaining water management goals requires the expenditure of public and private funds that must be used as effectively and efficiently as possible. Therefore, water management strategies must be developed using sound economic principles.

- **Educating the public on water issues and involving the public in developing management programs is essential to building and sustaining an effective water management effort.** It is ultimately the members of the public who are asked to accept and commit to implementing water management strategies. It is essential to provide them with the information they need to become and stay informed and to provide them with the opportunity to participate in developing water management programs.

- **Water management efforts should be consistent with, and enhance, the quality of life in the community.** Those of us who live in the State of Arizona and within AMAs will be the beneficiaries of wise water management. Social values and environmental quality considerations

are integral to the development of water management approaches in Arizona. Adverse impacts on the quality of life and the potential for economic development must be avoided to the greatest extent possible.

- **Water supplies available today must be used to meet the needs of the future.** Excess effluent and CAP water available during the third management period must be managed to meet growing AMA demands and to provide adequate supplies during future water shortages. Underground storage of effluent and excess CAP water by the AWBA and by AMA water users is an important component of successful water management.

- **Water management programs should provide a stable institutional framework that creates an environment of certainty in water resource decision-making.** Groundwater right holders, individual water use customers, and the development community are key decision-makers who must commit to, and implement, long-range plans in a world of evolving regulations. The provision of a predictable framework within which these programs will evolve reduces the uncertainty for the community and increases the likelihood of success. Additionally, management programs must be clearly understood and free of ambiguity.

- **Local water management issues must be addressed as regional and statewide strategies are developed.** There must be recognition of the impacts that regional or statewide water management programs can have on local water users, as well as the ability to identify and assist in developing programs designed to specifically address local area water management problems.

- **Water management programs should be based on the premise that the future issues are unlikely to be the same as those we have encountered in the past, and that the pace of change is likely to increase.** In order to provide maximum flexibility for the future, databases must be enhanced and tools developed to identify trends early and to test scenarios that vary from current conditions.

1.5.2 Third Management Plan Objectives

The following objectives must be achieved during the third management period to develop the necessary management tools.

- The Department will establish and implement Third Management Plan water conservation requirements and groundwater replenishment requirements equitably among all groundwater users.

- The Department will maintain Second Management Plan conservation efforts which were effective, expand them where appropriate, and will recognize existing conservation efforts in setting Third Management Plan conservation standards.

- The Department will be flexible when addressing unique circumstances associated with conservation program compliance.

- The Department will provide financial and technical assistance to implement water conservation, augmentation, and monitoring programs that are beneficial to the AMA.

- The Department will expand public assistance and public education efforts to reach a larger portion of the public.

- The Department will provide incentives to encourage water conservation that are consistent with water management objectives.

- The Department will strive to take maximum advantage of excess renewable water supplies while the opportunities exist.

- Department staff will actively participate in regional and local water management planning and cooperative projects.

- The Department will encourage recharge activities in areas where storage of renewable supplies will be beneficial from a water management perspective. Management of both storage and recovery activities will be required to protect future water supplies and the storage capacity of the aquifers.

- The Department will collect, analyze, and maintain data to provide the information necessary to identify water management issues and propose appropriate and timely solutions.

- The Department will encourage coordination between the many agencies that affect water policy, particularly activities of the AWBA, the CAWCD, CAGRD, ACC, and ADEQ.

- The Department will endeavor to enhance water quality management efforts to preserve the quality and quantity of water available for existing and future needs.

- The Department will work with the state's political leadership, water users, and the public to identify and develop the tools and additional statutory authority necessary to achieve water management goals and objectives, including reaching safe-yield by 2025.

1.5.3 Third Management Plan Development Process

1.5.3.1 Program Development and Implementation

This Third Management Plan is the result of a three-staged work effort that began in 1994. The first stage involved data collection and analysis culminating in development of a "State of the AMA" (SOAMA) assessment. In the second stage, issues identified in the SOAMA assessment and those raised by the community were addressed in issue papers describing background information and identifying recommended alternatives to address the issues. The third stage involved developing recommended alternatives into program concepts and, ultimately, into the program components presented in the Third Management Plan. Throughout preparation of the Third Management Plan, public input and technical research have been used to identify issues, objectives, and solutions.

1.5.3.2 Public Participation

Multiple levels of public input have been utilized in the development of the Third Management Plan. The Code established a five-member GUAC for each AMA. AMA directors and staff have met regularly with the GUAC to obtain member opinions and recommendations on all components of this plan. These meetings were open to the public, and interested groups and individuals communicated their views and recommendations in this forum. Pursuant to A.R.S. § 45-421(1), the GUAC must comment on the proposed management plan before it is promulgated.

The Department also consulted with numerous technical advisory committees (TACs) comprised of technical experts, water providers, industry representatives, agricultural representatives, scientists, and other organizations and individuals concerned with water use and water resource issues. These TACs were established to review material and identify issues in the following areas:

- Municipal (Phoenix and Tucson AMAs)
- Agriculture (Phoenix, Pinal, and Tucson AMAs)
- Turf-related Facilities (Phoenix and Tucson AMAs)
- Metal Mining Facilities (Tucson AMA)
- Sand and Gravel Facilities (Joint committee for the Tucson, Phoenix, and Pinal AMAs)
- Large-scale Power Plants and Cooling Facilities (Joint committee for the Tucson and Phoenix AMAs)
- Dairy and Feedlot Operations (Joint committee for the Tucson, Phoenix, and Pinal AMAs)
- Augmentation and Recharge (Phoenix and Tucson AMAs)

The TACs met over approximately a two-year period, and members spent considerable time reviewing data, discussing issues, and assisting in developing regulatory programs. Participation by the TACs was critical in development of the management plan. Technical review was also provided by outside committees and experts on the water quality, water resources, and water budget chapters. Public comments were received in meetings with interested parties and during and following presentations to civic organizations and the general public. The Department's philosophy is to maximize public input on the content of the management plans to ensure that the public's concerns and ideas are adequately incorporated.

Additional public input was obtained through public hearings conducted pursuant to A.R.S. § 45-570. In these hearings, the Department presented information in support of the plan and obtained comments regarding the plan. Before the plan was adopted, the Department's director reviewed all written and oral comments submitted as part of the hearing process, made revisions to the plan when warranted, and prepared a written response.

1.6 THIRD MANAGEMENT PLAN CONTENT

The Third Management Plan addresses water conservation, water augmentation, water quality, and related water management programs for the years 2000 to 2010, and comprises the following primary elements:

- Assessment of the status of water supplies and demands in the AMA
- Mandatory conservation requirements for agricultural, municipal, and industrial groundwater users and groundwater distribution systems
- Water supply augmentation and recharge program
- Water quality assessment and management program
- Conservation, augmentation, and monitoring assistance program
- Future directions for third management period (2000 to 2010)

Statutory guidelines provided in A.R.S. §§ 45-566 and 566.02 direct that the following components be included in the Third Management Plan:

- New irrigation water duties for each farm unit
- An alternative agricultural program for Irrigation Grandfathered Right holders
- Additional reasonable reductions in per capita use to those specified in the Second Management Plan for municipal providers
- A Non-Per Capita Conservation Program for municipal providers
- Appropriate conservation measures for individual users on municipal systems
- Conservation or rate-of-use requirements for deliveries of untreated water
- Reasonable conservation requirements for small municipal providers
- Additional economically reasonable requirements for groundwater distribution by cities, towns, private water companies, and irrigation districts

- Conservation requirements for industrial uses based on latest commercially available conservation technology consistent with reasonable economic return
- A program for additional augmentation of water supplies by AMAs, including incentives for artificial groundwater recharge
- Cooperation with the Arizona Department of Environmental Quality in developing a groundwater quality assessment for the AMAs, including suggestions for groundwater protection
- A program for conservation assistance to water users within the AMA
- At the discretion of the director, a program subsequent to January 1, 2006 for the purchase and retirement of grandfathered rights
- A determination of historic annual net recharge for AMAs in which a groundwater replenishment district is located
- Recommendations to the Arizona Water Banking Authority regarding storage capacities within the AMA, priority storage locations, and extinguishment of long-term storage credits

In addition, the Department will describe in the Third Management Plan the water management issues emerging in the AMA and the programs or changes in statute or rule that may be required to resolve these issues.

The Third Management Plan contains a great deal of information on water use characteristics, water supply and demand projections, water quality, local water management issues, needs for water supply augmentation, and the Department's management approach to these issues. This information is provided to explain the plan's development, educate interested individuals regarding the water management issues facing the AMA, and develop future water management policies for the AMA. Throughout the document significant policy statements exist regarding how the Department proposes to manage the AMA's water supplies pursuant to the provisions of the Code and the provisions of this plan. The regulatory requirements for groundwater users and water distribution systems are printed in italics for easy reference and are located at the end of Chapters 4 and 5 and after each industrial use sector in Chapter 6. Chapters 8 and 9 contain eligibility criteria for underground storage and recovery facilities and for conservation, augmentation, and monitoring assistance projects.

1.7 EMERGING CHALLENGES FOR THE PHOENIX AMA

Several major challenges are emerging as the AMA moves into the third management period. They are:

- The amount of groundwater pumping allowed under the Code, the Second Management Plan, and the AWS Rules through grandfathered rights, groundwater withdrawal permits, designated and undesignated providers, and untreated providers creates a significant obstacle toward our efforts to achieve safe-yield. The burden of reducing mined groundwater does not apply proportionately or equitably to all water-using sectors.

- Groundwater and non-groundwater sources are managed under different statutes with limited integration and consistency in approach. In a rapidly growing AMA with multiple water sources, sound management of only one source may be problematic.

- During times of water surpluses (excess/surplus CAP and excess effluent), a water management strategy should be implemented that is progressive and responsible. Either direct use of surplus renewable supplies or recharge should be actively pursued, while the Department continues to require reasonable use efficiencies. In later years, these excess supplies will be fully utilized and current surpluses may turn to shortages. Stabilizing our supplies through conversion from groundwater to excess/surplus renewable supplies and maximizing our supplies through conservation should be emphasized.

- The Phoenix AMA is characterized by divergent water use patterns and divergent groundwater conditions. Municipal and industrial growth is occurring at nationally recognized rates, while agricultural demand has and will continue to moderately decline. While the AMA in general continues to record significant groundwater level declines, certain areas within the AMA are experiencing declines so severe that they restrict the potential for further growth and development. Other limited areas are exhibiting water-logging conditions that cause other types of problems. While recognizing that the goal of the Phoenix AMA is to achieve safe-yield on an AMA-wide basis, localized water management may be necessary to fully achieve the Code's stated policy of "protecting and stabilizing the general economy and welfare of this state and its citizens." A.R.S. § 45-401(B).

1.8 CONCLUSION

Much has been accomplished in the area of water management during the second management period. Conservation is incorporated into the programs of more water users than ever before. Augmentation of traditional water sources has concentrated on accelerated CAP importation, full utilization of other surface water, and greater utilization of effluent. Conversion from groundwater to renewable resources has been required by AWS Rules and aided through the proliferation of groundwater recharge projects and wetlands, and the formation of the CAGRD and the Arizona Water Banking Authority. Financial and technical assistance in the areas of conservation and augmentation, provided by the Department to water users, has provided needed resources and research to carry out various beneficial programs. The Third Management Plan represents continuation and expansion of programs found to be successful in the First Management Plan and Second Management Plan, as well as additional efforts to encourage conservation, augmentation, and conversion to renewable resources.

These efforts alone, although impressive, will not result in the attainment of the safe-yield goal. Based on this conclusion, the Third Management Plan identifies unresolved issues, the obstacles to their resolution, and the direction we must take during the third management period and beyond to meet the mandates of the Code.

The Third Management Plan is designed to present the Department's blueprint for working with water users and policy-makers to achieve the Phoenix AMA's water management goals and objectives. Continued commitment will be needed from the Department, the water-using community, and the public. With this support, the Department can respond to changing water issues and needs while maintaining a management structure that ensures a dependable water supply for Arizona's future.